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**Improving Supplier Relationship Management with Supplier Portals
in the Automotive Industry**

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To my husband and son whose support was crucial to this work.

Abstract

Companies in the automotive industry, Tier 2 companies in particular, struggle to succeed in the marketplace under strict supply chain conditions determined by Original Equipment Manufacturers (OEMs). It is therefore of utmost importance, to find strategies that allow these companies to improve their processes and obtain more advantages. In this context, Supplier Relationship Management (SRM) gains particular importance.

The literature review, which served as base for this work, is related to the importance of SRM and the strategies used by companies to manage their suppliers. It also examines how Information and Communication Technologies (ICTs) can support and improve SRM processes.

ICTs are a strong ally of these companies, because tools such as Supplier Portals can address companies' needs in terms of SRM improvement. For this reason, this study investigates the importance of SRM and how ICTs can improve SRM processes for companies in the automotive industry, in particular those in a Tier 2 position.

This study was focused on the implementation of a supplier portal on an automotive industry company, to understand how companies in this industry handle SRM, and the strategies they use. The results suggest that a sustained SRM process creates advantages for companies, because a structured, organised and well-managed SRM process through a Supplier Portal, favours relationships and bring benefits for buyers and suppliers.

Resumo

Empresas na indústria automóvel, particularmente empresas Tier 2, lutam para se manterem no mercado sob regras rígidas de fornecimento determinadas pelos Fabricantes de Equipamento Original (OEM). É por isso, da maior importância, encontrar estratégias que permitam a estas empresas melhorar os seus processos e obter mais vantagens. Neste contexto, a Gestão do Relacionamento com os Fornecedores (GRF) ganha particular importância.

A revisão de literatura que serviu de base a este trabalho, está relacionada com a importância da Gestão do Relacionamento com Fornecedores e as estratégias usadas pelas empresas para gerir os seus fornecedores. De seguida foi também estudado como as Tecnologias de Informação e Comunicação (TIC) podem dar suporte e contribuir para melhorar os processos de GRF.

As TIC são um poderoso aliado destas empresas, pois ferramentas como Portais de Fornecedores podem ser a solução para as suas necessidades em termos de GRF. Assim, ao longo deste estudo, é estudada a importância da GRF e como as TIC podem melhorar o processo da GRF e como as TIC podem melhorar esses processos nas empresas da indústria automóvel, particularmente as que se encontram na posição Tier 2 na cadeia de fornecimento.

Este estudo teve como foco a implementação de um Portal de Fornecedores numa empresa da indústria automóvel e permitiu compreender como é que uma empresa trata a GRF e quais as estratégias que adota nesta gestão. Os resultados sugerem que uma GRF sustentada cria vantagens para as empresas, pois um processo de GRF estruturado, organizado e bem gerido através de um Portal de Fornecedores, favorece as relações e traz benefícios tanto para compradores como para fornecedores.

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List of abbreviations

CI - CONTINUOUS IMPROVEMENT
COF - FINANCIAL CONTROLLING
COM - COMMUNICATION
COP - OPERATIONAL CONTROLLING
CRM – CUSTOMER RELATIONSHIP MANAGEMENT
EEM - EARLY EQUIPMENT MANAGEMENT
EIP – ENTERPRISE INFORMATION PORTAL
EPM - EARLY PROCESS/PRODUCT MANAGEMENT
ERP – ENTERPRISE RESOURCE PLANNING
FIN - FINANCE
HR - HUMAN RESOURCES
HSW - HEALTH AND SAFETY AT WORK
IATF – INTERNATIONAL AUTOMOTIVE TASK FORCE
ICT – INFORMATION AND COMMUNICATION TECHNOLOGIES
IETM - INFRASTRUCTURE, EQUIPMENT AND TECHNOLOGY MANAGEMENT
INN - INNOVATION
ISM - INFORMATION SYSTEM MANAGEMENT
ISO - INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
LOG - LOGISTICS
MNG - MANAGEMENT
OEM – ORIGINAL EQUIPMENT MANUFACTURER
PPAP – PRODUCTION PART APPROVAL PROCESS
PPM – PARTS PER MILLION
PPMM- PRODUCT, PLANNING, MAKING AND MANAGING
PR - PRODUCTION
PROC - PROCUREMENT
PROJ MNG - PROJECT MANAGEMENT
QEMS - QUALITY AND ENVIRONMENT MANAGEMENT SYSTEM
QL - QUALITY
QN – QUALITY NOTICE
RM – RAW MATERIAL
S - SALES
SCM – SUPPLY CHAIN MANAGEMEN
SIAP – SISTEMA INTEGRADO APOIO À PRODUÇÃO
SRM – SUPPLIER RELATIONSHIP MANAGEMENT
TPM - TECHNICAL PROCESS MANAGEMENT
TRandDVL - TRAINING AND DEVELOPMENT

1 Introduction

1.1 Project Background

The automotive industry can be considered one of the most competitive and demanding industries in the world. The complexity of the industry's supply chain poses several challenges to its members, who struggle to be the best at price, Quality and service. The challenge lies in having a strong Supply Chain Management.

According to The Global Supply Chain Forum, "Supply chain management is the management of relationships in the network of organizations, from end customers through original suppliers, using key cross-functional business processes to create value for customers and other stakeholders".

In line with this statement, Douglas M. Lambert considers that a company's success lies on their ability to manage relations with the supply chain they belong to, "...corporate success is based on relationship management with both suppliers and customers."

In the context of the automotive industry and the Tier 2 supplier's level, supplier relationship management gains particular importance since the key suppliers are mostly pre-selected by OEM (Original Equipment Manufacturer). As such, the participation of the Tier 2 on the contract negotiation is limited if not null. The contracts done between OEM and the raw material suppliers are negotiated very early in the supply process, in the development phase, and only the participants in this stage of the business gain some negotiation leverage. Tier 2 suppliers have the possibility to select suppliers for materials not considered critical by the OEM. However, it is the Tier 2 supplier's job to manage their suppliers, nominated or not. Therefore, Tier 2 has to focus their supplier management particularly on the Quality and performance and leave the selection to non-business material suppliers.

Further to Kannan and Tan (2002) the base to supplier management lies in three main blocks: supplier selection, supplier evaluation and supplier development and each company has to follow these baselines according to their strategic goals.

Raw materials have the highest slice in the final product value, so it becomes extremely important to manage suppliers. Liker and Choi (2004) state that nowadays companies tend to buy more components and services to their suppliers than in the past focusing on their core competences. As such, companies must have an efficient and thorough supplier management process.

In the current global market with increasing supplier offer, companies have to establish clear strategies and criteria that will enable them to select the best suppliers (Chan and Chan, 2004). Reducing the supplier portfolio is one logical option since it will allow the company to better manage the relationships, establish long-term relations, foster the buyer-supplier relationships and collaboration, which will allow them to develop competences and reach higher Quality standards (Kannan and Tan, 2002).

Most companies base their relations with the suppliers with their performance levels this allows them to identify the suppliers who fit their best interests and which should be subject to improvement strategies. It also common that companies implement strategies, which aim to

develop their capacities so that their performance improves. This strategy of supplier development is only possible through mutual cooperation (Chavhan, Mahajan and Sarang, 2012) and, as previously stated, supplier performance is key to Tier 2 buyer.

Several companies rely on Information and Communication Technologies (ICT) to support them in this selection, evaluation and development process. Baglieri et al (2007) consider that ICTs have a significant impact on the efficiency of the business processes. In fact, they state that through ICTs “stronger relational ties will develop across supply chains”. A specific form of ICT – Supplier Portals - have been considered to facilitate this relationship.

Shilakes and Tylman (1998) defined the term *Portal* for the first time as: “Enterprise information portals are applications that enable companies to unlock internally and externally stored information, and provide users a single gateway to personalized information needed to make informed business decisions”. The concept of portal has evolved since then. E. Baglieri et al summarised in their study some key definitions. They consider Supplier portals as a technological solution “which provides a unified application access, information management, knowledge management both within enterprises as well as between them and their suppliers, trading partners, and channel partners.” They also define it as a technological solution that “promote information sharing” and supports supplier management and “create a sense of community” between suppliers and buyers, which in turn can “sustain the creation and persistence of collaborative practices with suppliers over time”.

According to the literature, supplier portals seem to be the right tool for a company that needs to strengthen their supplier management process. The purpose of this work is to understand the importance of supplier relationship management and its benefits in an automotive industry supply chain, and study how a Supplier portal implementation affects the company’s SRM process.

1.2 Problem Description

This study results from the implementation of a Supplier Portal in an automotive industry company. COINDU SA is part of the worldwide, highly competitive business of automotive industry, where supplier management and supplier relationship management plays a crucial role in the company strategy.

One of the purposes is to understand how companies handle Supplier Relationship Management, particularly in terms of performance and evaluation, selection and development. Additionally, it is important to understand how companies rely on Information and Communication Technologies to support them in Supplier Relationship Management.

As a Tier 2 company, subject to strict rules of IATF (International Automotive Task Force) standards, and in a level of a supply chain, which poses several challenges, the company decided to implement a Supplier Portal to improve their supplier management process. The main goal is to understand how the company in study currently manages their suppliers and how the Portal will support and improve the SRM process.

This study occurred under in real work conditions, which enabled to observe in real-time the practices and strategies implemented by COINDU SA in their supplier relationship management.

1.3 Research Questions

The purpose of this work is to study the importance of an effective supply chain management with particular focus on how the relations between supplier and buyer in a Tier 2 context work. Furthermore, this work aims to show how ICT can support companies in this process.

This work is based on a literature review about supplier relationship management within the Supply Chain and the benefits of Information and Communication Technologies for SCM.

Finally it was analysed the current SRM process at company COINDU SA and how the implementation of the Supplier Portal expects to improve this process.

The study aims to answer following questions:

1. How important is Supplier Relationship Management for a Tier 2 company?
2. How do these companies manage their suppliers?
3. How will a Supplier Portal support and/or improve a Supplier Relationship Management process?

Through these research questions, the study expects to understand the importance of the supplier relationship management for a Tier 2 company, understand how that process is done currently, and what benefits come from the implementation of a Supplier Portal

1.4 Report Outline

Based on the study objectives mentioned above, the report is organised in six sections, as described below.

The first section describes the theme of the study and the reasons behind the choice of the thematic. It is also exposed the purpose of the work and the objectives which it is expected to reach.

As a result of the study objectives, the second section, presents an intensive literature review on the theoretical framework around the Supply Chain Management and Supplier Relationship Management throughout time and about the impact a structured and well-established SRM has on companies'. Additionally, it is also referred the impact that Information and Communication Technologies have on SCM and on SRM and how companies' strategies regarding these topics involve investments in ICTs as a solution to potentiate these processes, particularly through web-based portals.

In the third section the company, COINDU SA is characterised and the problem this study aims to address are presented.

The fourth section describes the methodology used, its purpose and the identified research questions that oriented the work developed. Afterwards, in the fifth section, there is a more detailed presentation of the methods used and of the data obtained through direct observation, interviews and inquiry. In this section, the data obtained from the interviews and inquiry and also by the direct observation carried out during the study, are analysed, in order to understand how the company in study handles SRM and which strategies it adopts in order to improve the relationship with suppliers, with special focus on the Supplier Portal

In the last section of this work, the results of this study are reported, aiming to answer the research questions that guided the present study. Finally, the existing limitations and future research suggestions are presented.

2 Literature Review

Considering the purpose of this work, in this section it is presented some prominent factors related to Supply Chain Management and Supplier Relationship Management, and their growing importance for companies, based on the selected literature review. The impact of a proper, efficient and structured management of suppliers and their relationship towards buyers is also evaluated. Additionally, it is verified the impact of Information and Communication Technologies has on above mentioned managed and how companies make use of these tools to improve and enhance their Supply Chain and Supplier Relationship Management processes.

2.1 Supply Chain Management

Supply Chain Management has evolved over the years and it is still subject of research because there are different definitions of SCM. Some authors define SCM as Logistics; others consider it a combination of Purchasing, Operations and Logistics (Monczka et al, 2011). SCM is the management of the relationships across the supply chain network; it is not a “chain of businesses” but “a network of businesses and relationships” (Lambert and Cooper, 2000).

Globalised markets are highly competitive and complex. Customers are becoming more demanding and companies must innovate in order to gain competitive advantage (Carvalho et al, 2013).

Customers look for a variety of products with high Quality at the lowest price in shortest time possible, and this is a challenge for most companies, being able to provide customers with the right product, at the lowest price at the required date. It is therefore fundamental that the companies are ready to answer such demanding market conditions, which is only possible through an effective coordination within the supply chain (Mentzer et al, 2001).

“The more, the merrier” used to be a lead in for companies that pursued profit, because mass production allowed companies to have lower prices and better margins (Tan, 2002). In time, these companies realised that this strategy led to high inventory levels, which in turn led to storage and distribution complications. In order to solve these logistic issues, Supply Chain Management (SCM) concept emerged to address the need to handle products from the point of origin to the point of consumption (Cooper and Elram, 1993; Wisner and Tan, 2000). As a result, companies began to study ways to reduce costs by lowering inventories and optimizing their Logistics processes. The goal is to deliver the right amount of product in the agreed timings thus avoiding waste (Scanell, Vickery and Dröge, 2000).

Markets change over time and new trends lead to new ways of supply chain management. SCM concept evolved according to market evolution. Competition grows as market evolves and SCM has to adjust in order to respond the new needs. The need to maintain low inventory levels and still be productive is still a goal, but in the long term, companies have to find new strategies in order to answer to customer’s needs without jeopardizing profitability. In order to address this companies start to implement integration strategies.

Although difficult to implement, considering it requires the acceptance of all those involved, integration results in efficiency improvement and customer focused orientation. SCM should

be seen as a “cross disciplinary concept” (Mentzer, Stank and Esper, 2008), because all processes in a company are involved in and affected by SCM. Integration of key processes as Quality management, Purchasing, Operations, sales, results in a successful coordination of activities and ultimately in competitive advantage.

Bechtel and Jayaram (1997) have studied the different definitions of SCM and their scope and concluded the main differences lie in the intervenient parties. These authors consider Purchasing, production and distribution, the base of supply chain, whereas distribution includes material and information flow, from the point of origin until the final customer and the integration of all processes and functional areas.

Cooper and Lambert (1997) also mention this integrative characteristic of SCM; they consider that “business processes become supply chain business processes” because they all act together to achieve a common goal, “meet customer’s requirements”.

The inter and intra-organizational component of supply chain is also defended by Carvalho et al (2012), who state that supply chain management, integrates search and supply components inside companies and between companies.

Alongside with integration is the relational component. Some authors point out that supply chain management is relationship management, whether within or between companies. As stated by Mentzer et al (2001), La Londe (1997): “(...) the process of managing relationships, information and material flows across enterprise borders to deliver enhanced customer service and economic value through synchronized management of the flow of physical goods and associated information from sourcing to consumption”. The authors point out this relationship management as key to a successful supply chain management.

Lambert, Cooper e Pagh (1998) also refer supply chain management as the management of the supply chain members’ relationships. In order to achieve effective relationships it is important to have a strong coordination and cooperation between the supply chain members. Furthermore, Betchel e Jayram (1997), state that the future of the supply chains lies in partnerships, strategic alliances and cooperative relationships.

Elements as integration and cooperation, information sharing, common customer oriented goals have been used to describe supply chain. Mentzer et al (2001) have selected a set of activities, which are crucial to a successful SCM implementation.

Table 1 - Supply Chain Management Activities

1. Integrated Behavior
2. Mutually Sharing Information
3. Mutually Sharing Risks and Rewards
4. Cooperation
5. The Same Goal and the Same Focus on Serving Customers
6. Integration of Processes
7. Partners to Build and Maintain Long-Term Relationships

Source: Mentzer et al (2001)

These activities will lead to a successful SCM implementation. In fact, these activities summarise the key characteristics of SCM defended by several authors throughout time.

Further to The Global Supply Chain Forum, eight key processes in the supply chain management contribute to competitiveness and profitability.

Table 2 - Supply Chain Management Processes and Functions

Customer Relationship Management	Develop and maintain relationships with key customers; Segment customers based on value; Increase customer loyalty; Create Product and Service Agreements (PSA);
Supplier Relationship Management (SRM)	Develop and maintain relationships with key suppliers; Segment customers based on value; Define, Negotiate and manage PSA; Partnership development and management;
Customer Service Management (CRM)	Monitoring of PSA; Problem solving; Interface with other processes to ensure PSA's are achieved;
Demand Management	Balance customers' demands and supply chain capabilities; Synchronize supply and demand; Reduce variability and increase flexibility; Coordinate marketing plan and production plans;
Order Fulfilment	Prepare the firm to meet customers' requirements; Maximize companies' profit; Strategy planning;
Manufacturing Flow Management	Obtain, implement and manage company flexibility; Material flow management; Manage manufacturing flexibility, planning and execution;
Product development and Commercialization	Develop and commercialize new products; Coordinate flow of new products;
Returns Management	Manage returns, reverse Logistics, gatekeeping and avoidance within the firm; Implement control measures to reduce returns; Monitor performance;

Source: Adapted from Cooper e Lambert (2000)

Supplier Relationship Management and Customer Relationship Management are key processes proving the necessary input and output for the development of all other processes. In the end, supply chain management is about processes, organizations and the relationships that arise between them.

2.2 Supplier Relationship Management

Several authors consider SRM a critical process, because companies expect suppliers to reduce costs, but increase Quality, innovative without jeopardizing deadlines. However, “It’s tougher to build relationships with suppliers than companies imagine” (Liker and Choi, 2004). Therefore, companies have to be aware of what they expect from suppliers, in order to select them accordingly and obtain the expected benefits from the relationships.

Based on a case study in the automotive industry, Langfield-Smith and Greenwood, have identified four models of buyer-supplier relationships. First, the traditional model based mainly on profit. Suppliers would have high competition, because buyers had big suppliers database so there was a high risk of change. The main target in this model was price leaving Quality, delivery and design to a second place. There was low information sharing.

The second model described by the authors, was the stress model. This model is a result of globalised competition and demanding market. Quality stands side by side with price as a requirement to suppliers.

The third model, defined as a resolved model, is a model where price is still an important criterion, but Quality and delivery gain importance. Buyers begin to understand the importance of cooperative relationships with suppliers and start sharing information with them. This leads also to the adoption of techniques that improve Quality and delivery of products, which in turn lead to long-term contracts.

Partnership and supplier network model is the fourth model described by Langfield-Smith and Greenwood. In this model, companies establish relations with a smaller number of suppliers and prioritize those who stand out in the Quality and delivery criterion. Transparency, cooperation and trust are the baselines for long-term relationships. There is an increase of information sharing and companies share also goals, which benefits closer and interdependent relations.

The automotive industry has adopted the last model since companies are aware that “the winners (...) will be those who can organize long-term collaboration partnerships.” (Brandes et al, 2003, p.1). Cooperation and information are crucial to achieve competitive advantage.

Companies tend to reduce their supplier portfolio this will favour business, because they can negotiate better prices, improve inbound costs and ultimately establish long-term relationships. Additionally, suppliers will be more involved, participating more in product development and improvement achieving a higher cooperation and flexibility (Shin et al, 2000). Smaller supplier databases allow companies to spend less time, resources at supplier management, facilitates integration and synchronization of processes and Operations, which will result in lower costs, and shorter lead times (Hines, 2004).

The purpose of SRM is to select, evaluate and develop suppliers in order to create partnerships which outcome is a win-win relationship where both parties benefit.

2.2.1 Supplier Selection

In the past, price was the key requirement in the supplier selection. With globalization, and with the increase of competition, new elements were taken in consideration in the supplier selection process. Considering the impact they have on the product, Quality and delivery are two other factors considered by companies, when they need to choose a business partner.

However, there are other criteria, which companies use to differentiate several suppliers: the provided service, production capabilities, technology, cultural factors and risk analysis, financial capabilities, among others (He, 2014).

The most common method is multi-criteria selection. Companies elaborate a set of criteria based on their strategy and select their suppliers accordingly.

2.2.2 Supplier Evaluation

In the automotive industry, supplier evaluation is critical, since the final product is assembled with components from different suppliers. Moreover, the suppliers influence a company's performance directly, so it is important to identify the weaknesses and act to improve them.

Additionally, companies have to ensure the suppliers fulfil their requirements, so they must monitor and follow their suppliers' performance.

Supplier evaluation must focus on the most relevant aspects, which will affect their performance, such as Quality, price, technology and innovation, flexibility and delivery efficiency (Bedey et al,2009).

The purpose of the supplier evaluation is to reach continuous improvement and minimize risks and costs associated with the performance. After the assessment, companies have to evaluate the results and set action plan in order to correct the problems and prevent reoccurrence.

Additionally, companies have to keep their suppliers motivated to maintain and pursue good results so companies create rewarding systems and give their top suppliers advantages in the business.

As seen previously, supplier evaluation is of utmost importance, because it allows companies to identify and anticipate flaws, take corrective and preventive measures in order to minimize problems in the Quality or service. Moreover, this enables companies to identify their supplier's weaknesses and assist them in their improvement, thus economizing resources (Minahan and Vigoroso, 2002).

In 2015, Oflac, has identified Quality, price, logistic capability, information sharing, trust, contractual terms, social and environmental responsibility and innovation, the main criteria for supplier evaluation and selection.

a) Quality

Consumers are very demanding in terms of Quality. In world where competition is fierce, Quality is an eliminating factor, so it is important to ensure that suppliers deliver with good Quality, but also that they control their products to guarantee Quality standards.

The responsibility to ensure Quality lies on all those involved in the supply chain, whose purpose is to guarantee customer satisfaction. Robinson e Malhotra (2015, p.319) state "(...) the formal coordination and integration of business process involving all partner organizations in the supply channel to measure, analyse and continually improve products, services and processes in order to create value and achieve satisfaction of intermediate and final customer in the market place." It is safe to say that Quality is linked directly to customer satisfaction.

In the automotive industry, Quality standards are very demanding and those who aim to enter the industry have to fulfil a set of requirements. Here some examples:

- **Certification:** In the automotive industry, certification is a requirement; the most common standards are ISO 9001, ISO 14001, ISO TS 16949 and more recently IATF. This is a guarantee and a set of Quality standards are met and helps to grow relationship of trust between buyer and supplier.
- **Production Part Approval Process (PPAP):** this process is a set of documentation usually together with sampling, which aims to ensure the Quality of the product and of the processes of the supplier. PPAP process is mandatory for suppliers, in order to certify that all production, control, capability processes are followed and that the product is delivery with the agreed Quality standards (He, 2014).
- **Rejected parts per million (PPMs):** whenever a product does not comply with the agreed Quality standards, it is rejected. The number of rejected parts is quantified in PPMs (parts per million). When selecting and evaluating a supplier, it is important to agree a PPM target, that the supplier must obey.
- **8D Methodology:** as a result of the customer's claims it is important to have a solid claim management process. 8D methodology's goal is to identify the root cause of the Quality claim, and implement a set of actions to correct and prevent reoccurrence. Claims are usually associated with costs (customer dissatisfaction, bad product Quality, production stoppage, etc) so it is important to find effective methods to eliminate the roost causes (Riesenberger and Sousa, 2010). Additionally, it is important to assess the usage of 8D method by the supplier, their response time and proactivity in finding the root causes and implement the actions, which will solve the problem.

b) Price

Price is no longer a key criterion in supplier selection, but it is still considered as a differentiating element. Automakers consider the target price ratio and the price variation change to be the critical measure in terms of pricing practices. The target price ratio shows whether a supplier is successful at meeting the contracted price, it does not mean the supplier is unable to reach lower prices. The price variation change refers to the average annual price increase or decrease for a product after market introduction (Cusumano e Takeishi, 1991). Cusumano and Takeishi also refer the importance to consider throughout a negotiation, not only a product life cycle but also the supplier experience in terms of process, production or materials, acquired during that period, because this will allow obtaining annual price reductions.

These authors mention two aspects to consider by a supplier when presenting a price. First, a discount, direct or with saving, valid for a determined period. The higher the discounts, the better the evaluation of the supplier. Second, the relative price, which means it is necessary to verify the initial price offered by the supplier and compare it with the market price at that moment.

c) Logistic capability

A supplier's Logistics capability is of utmost importance. "Every shipment must be in the right place, at the right time and with zero defects" (González-Benito e Dale 2001, p.190). There are already several technological solutions, which facilitate the communication and delivery planning. Electronic data interchange (EDI) is one of the most commonly used. In order to select a supplier and evaluate their logistic capacity, it is important to consider some factors. On one hand, on time deliveries, which means a supplier must delivery according to

the agreed period in order to avoid failures at the customer. On the other hand, delivery precision it is also important. The supplier has to deliver the right quantity to avoid problems at the customer, like storage deficiencies, for example. In summary, a supplier logistic capability has to measure not only the deliveries on the right time but also on the right quantity.

d) Information sharing

In the globalized markets and with the speed of technological developments, it is easy to share information rapidly and in real time. Information is a key element in the decision-making processes of the Supply Chain. However, the owners of the information must be willing to share important information, which will be of good use to those who receive it. This ability to share information will increase the commitment levels between the parties (Cannon e Perreault Jr, 1999).

There are several technological solutions, which integrate supplier with other members of the supply chain, thus fostering relationships within (Betchel and Jayram, 1997). Information sharing will result in higher degrees of trust. Through these open relationships, the parties will understand each other's goals and will work together to achieve common benefits.

Nevertheless, companies have to be aware of what information to share, because the risk of opportunistic behaviour by elements of the supply chain exists.

e) Trust

As in all relationships, trust is the base to a successful outcome, and business relationships are not different. Therefore, it has to be part of the selection and evaluation process, because trust is the base of long-term relationships. Companies have to investigate whether a supplier is worth to be considered partner. Building relations based on trust will result on better performance and low uncertainty. Companies must trust their business partners in order to assume commitments (Kwon, and Suh, 2004).

A company's reputation in the market will have a strong impact in the ability to establish relationships. Therefore, when selecting and evaluating a supplier, the buyer has to consider the company's references, its financial capacity, its business experience and duration of previous relations. A good reputation is essential to be able to build new and long-term relationships, so having good references of a company is important. The financial capacity of a company is of utmost importance, because a buyer has to be sure there are no risks of delivery stoppages, usually this is ensured with a stable financial situation. A supplier's experience in the business will give the buyer a sense of security, because such a supplier will react faster to unexpected situations and provide solutions to potential problems. Finally, long-term relations result in better cooperation, mutual assistance and trust.

When properly considered, the above criteria, will give a buyer knowledge of their supplier. These criteria have to be periodically assessed to ensure a supplier's credible situation as a partner still remains.

f) Contractual terms

Business relations always involve contracts. Contracts help to reduce uncertainty and regulate the relations by specifying the duties and functions of both parties. (Cannon and Perrault Jr., 1999). Nevertheless, in time, as relationships grow the need for contracts reduces as the trust grows and the relations become stronger and more stable, because both parties fulfil their duties with the aim to achieve common goals. This will allow companies to save resources

and time which would otherwise be spent in meetings to formalise contracts (Lambert and Emmelhainz, 1996).

g) Social and environmental responsibility

Considering the growth of the automotive industry and the consequent competition, companies start to introduce Social and environmental responsibility practices. Companies with these practices promote sustainable growth and reduction of gas emissions and waste. This is also valid to suppliers, since the percentage of the suppliers' goods on the products sold to final customers is extremely high. For that reason, more than ever, companies use environment criteria in the supplier selection, evaluate and monitor the suppliers' environment performance, thus ensuring a favourable environmental performance for both (Ağan et al, 2016).

In the supplier selection context, an environmental conscience attitude is a differentiating criterion, since it reflect the interest of the supplier towards the society and environment, valued by most companies.

h) Innovation

By investing on innovation, companies increase their competitive advantage. Schiele (2006) defines innovation as the act of creating something new or renewing something that already exists, but in the corporate context, the author refers innovation, as something new to the company, regardless if that is already owned by competitors.

There should be a constant interaction among the elements of the supply chain aiming for continuous improvement and process innovation. Suppliers should actively participate in the development of new products, because this will allow the suppliers to participate early in the projects and selection phase, and so contribute to the improvement of the products (Bonaccorsi and Lipparini, 1994).

The suppliers' level of innovation has to be taken in consideration in the selection and evaluation process, in terms of technology, strategy and process (Rexhepi et al, 2013). By involving the suppliers in the development of new products, companies will reduce time spent, reduce costs and foster innovation levels (Pérez and Sánchez, 2001).

Oflac (2015) defends that the evaluation result of all of the above stated points, will enable the definition of development strategies.

2.2.3 Supplier Development

For decades now, the Japanese are role models in terms of doing business in the automotive segment. Jeffrey K. Licker and Thomas Y. Choi (2004) in their study, state that for the Japanese automakers there is more in suppliers' innovation capabilities than there is in cost savings. The authors found out from their research that Japanese automakers strongly defend that by developing their suppliers' problem solving skills, engaging them in their own lexicon to improve communication; their suppliers will be in a better position to bring them value.

Bedley et al (2009) defined supplier development as the effort done by buyers to improve their suppliers' capabilities and performance. The purpose of this investment is to prepare the suppliers to be able to respond to their customers' needs and anticipate eventual problems. Several authors share this view, as Krause, Scannell e Calantone (2000, p.34), who defend that supplier development is based on a company's ability to improve the suppliers' capabilities according to their needs: "(...) any activity undertaken by a buying firm to improve either supplier performance, supplier capabilities, or both, and to meet the buying firm's short- and/or long-term supply needs".

On the other hand, Hines (2004) points out that supplier development must bring benefits to both parties. This author states that companies need to select appropriate suppliers for their development programs, identify which of the supplier's capabilities better serve their business requirements, create and share performance measurement systems and establish trust and commitment in their relationships.

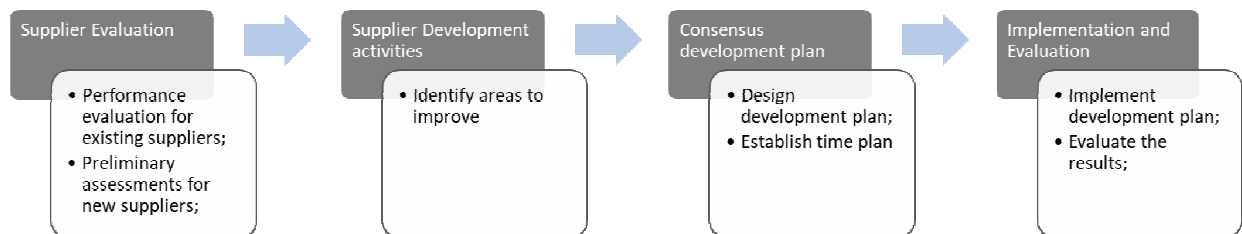
There are two development strategies identified by Lamming (1996), a paternalistic and a cooperative strategy. In the first strategy, the buyer makes suggestions, which can lead to improvements and expects the supplier to accept the suggestions. The second strategy, as the name suggests, is based on a common understanding and both supplier and buyer work together to identify improvement opportunities.

Krause and Ellram (1997b) consider supplier development under three perspectives:

1. Purchasing Perspective – companies view their suppliers as a mean to create competitive advantage, so their performance levels must be superior to that of the competitors' own suppliers. In this case companies create evaluation strategies to identify deficiencies which can be improved.
2. Corporate Perspective – the suppliers' development is according to the company's strategy. Supplier integration in new product development is common in the automotive industry, but only those that fulfil the customer's requirements and prove to have capacity will be considered part of the development process.
3. National Perspective – developing suppliers based in the same country as the buyer has benefits, because it will generate intern income (for the country) and will increase the reputation of the labour force in terms of Quality.

Hahn, Watts and Kimin (1990) their study have listed some steps that companies can take to develop their suppliers as represented in Figure 1:

Figure 1



Source: Own Elaboration based on Hahn, Chan K.; Watts, Charles A.; Kim, Kee Young, (1990)

The starting point is always the performance results of the suppliers, which will provide insight data of which areas need to be developed. After this assessment, the buyer company can create a team that, together with the supplier, will determine which measures will be taken and within which timeline. Finally, it is important to determine whether the development plan had the expected outcome or not. The suppliers that reach a positive result will fall into a "preferred supplier" or "certified" category, if not it will be eliminated (Hahn, Watts and Kimin 1990).

There are several activities, which companies use to support them in the supplier development process, such as (Bedley et al, 2009):

- Continuous supplier evaluation and feedback of results;
- Visit suppliers' companies and perform audits;
- Invite suppliers to visit the buyer's companies;

- Select certified suppliers;
- Provide supplier training to improve and perfect their competences;
- Create awarding programs for the best suppliers;

Whatever the development plans, measures and development strategies, they will not be effective without proactivity between companies as well as without long-term view. The key is to have clear objectives and aligned interests for both companies to reach the continuous improvement and mutual benefits (Scannell, Vickery and Dröge, 2000).

2.2.4 Partnerships

Companies tend to invest in development strategies of their suppliers, because they value their relationships and consider them worth the investment Krause and Ellram (1997a). Therefore, communication and collaboration are vital so that the parties understand the benefits that can rise from mutual efforts.

It is the importance of the relationships and the benefits than come from them that make companies establish partnerships. Ellram and Edis (1996, p.21) define partnerships between buyer and supplier as cooperative approaches, where a customer and several suppliers work together to obtain mutual benefits, sharing risks and gains. This cooperative relationship generates competitive advantage and better performance for the parties.

The benefits of partnerships can be low costs, value creation and competitive advantage above the competitors, which results in a higher customer satisfaction by answering to their needs and requirements (Mentzer et al, 2001). Better technology, higher Quality, lower inventories and higher market flexibility are also benefits obtained from partnerships (Wisner and Tan, 2000).

Lambert e Emmelhainz (1996) also share the view of partnerships as commitment and collaboration in gain and risk. The authors state three partnership models as represented in Table 3:

Table 3 – Partnership Models

Type I	Type II	Type III
<ul style="list-style-type: none"> ▪ Short term relationship; ▪ Recognition of the other as partner; ▪ Limited coordination of activities and planning; ▪ Involvement of one division or functional area of each organisation; 	<ul style="list-style-type: none"> ▪ Long term relationships; ▪ Coordination and Integration of activities; ▪ Involvement of multiple divisions or functional areas of each organisation; 	<ul style="list-style-type: none"> ▪ No “end date” relationship; ▪ View of the other as an extension of their own company; ▪ Significant level of operational integration;

Source: adapted from Lambert et al, (1996).

Type III partnerships are rare and difficult to achieve, usually created with suppliers critical for the success of the company.

Only a company with the ability to assume commitments, leadership and integrative capacity will be able to establish long-term partnerships. Liker and Choi (2004) in their article about relationships between companies and their suppliers, use Honda and Toyota “way of doing” as base for their six steps to achieve supplier development:

Figure 2



Source: Liker e Choi, (2004).

According to the authors, the base of a good relationship is the knowledge and understanding a company has of their suppliers. This will allow a company to pass on the supplier a sense of understanding and strengthen the supplier's trust. A smaller supplier portfolio is also fundamental, because the higher the number of suppliers, less effective will the development strategies be. Companies should encourage competition between suppliers as a way to achieve high performance levels and create partnerships with the best. Supplier evaluation and feedback is also crucial, because knowing where they stand in terms of their performance will allow the suppliers to take actions in case of failure and implement continuous improvement measures to keep the good performance level. In their article, the authors point out the technological value of the suppliers, which should be considered and not disregarded. Information sharing is valuable, but the company must take care to share information in a selective and structured way in order to avoid misunderstandings. Finally, the authors suggest the implementation of joint improvement activities, which will foster the relationship and create a sense of bonding.

To maintain a partnership demands hard work and is not always easy due to the differences that may come up between the parties. However, the adjustment made within a relationship in order to balance the differences, demonstrate interest and willingness to keep and improve the relationship, assuming a commitment and generating trust (Cannon and Perrault 1999).

2.3 Information and Communication Technologies - Web-based Portals

Managing relationships with suppliers is, as clearly presented above, of utmost importance for companies. The arrival and constant evolution of Information and Communication

Technologies (ICT) have a strong impact on the buyer-supplier relationships, in content and also in the dynamics of the relationships (Baglieri et al, 2006).

These technological solutions promise improvements in all processes of the supply chain, from procurement to Logistics and Operations, Quality and finance, with particular impact in performance ((Baglieri et al, 2006).

Baglieri et al, 2006, defend that ICTs have reduced the impact of intermediaries in the supply chain and made possible new forms of relationships. In their study, the authors, state that ICTs improve and foster buyer-supplier transactions efficiency and other purchase processes. ICTs not only affect positively the Logistics processes, since both supplier and buyer can manage better and control the physical flow of goods along the supply chain, but also improve the integration and coordination of all members of the supply chain.

Tan (2001), cited by Baglieri et al (2006) in their article, identifies the improvement of many areas through ICTs: cost performance, lower procurement costs, better customer service, more process capability, productivity and dependability.

Many authors defend that ICTs bring many benefits to companies and in particular improve supply chain integration and develop stronger relational ties (Frohlic and Westbrook, 2001, cited in Baglieri et al, 2006). Citing Leek et al (2003), Baglieri et al (2006), point out the improvement of the integration along the supply chain, allow information sharing in a “free and honest” way. This also creates better communication channels and affects interaction processes and relationships. However, the authors also stated, that it does not necessarily improve the Quality of the relationship, because ICTs make relationships more formal and impersonal, more task oriented and less collaborative.

Authors and scholars of Purchasing and Supply Chain Management, agree that ICTs can improve business performance, considering the process automation, reengineering and synchronization of activities.

There are several technological solutions in the market, available for companies that intend to improve their processes.

Clarke and Flaherty (2003) have listed six types of Portals as summarized in Table 4.

Table 4 – Types of Portals

Type of Portal	Characteristics
Informational	<ul style="list-style-type: none"> - EIP – Enterprise information Portals; gather and organize the large quantities of unconnected data; - Allow the user to make better informed decisions
Transactional	<ul style="list-style-type: none"> - Collect information and finally buy products and/or services;
Horizontal	<ul style="list-style-type: none"> - Covers a large number of general topics and often reaches a very broad audience;
Vertical	<ul style="list-style-type: none"> - Targets a particular audience and contains great depth of information and content within a specific category;
Private	<ul style="list-style-type: none"> - Restricted to a specific group of users within an organization and/or external groups;
Public	<ul style="list-style-type: none"> - Available to everyone without restrictions;

Source: Own elaboration based on Clarke III, T.B. Flaherty, (2003).

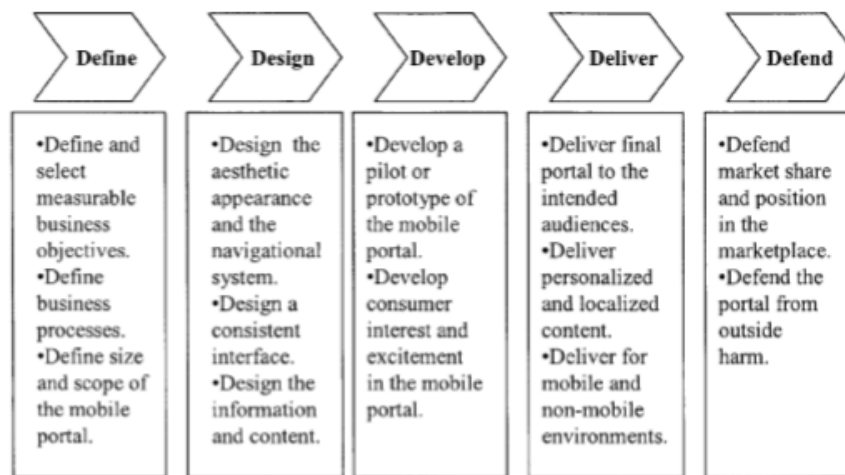
In the industry context, Supplier Portals fit the Private portals category, because “Once connected, trading partners can exchange business documents, purchase orders, acknowledgements, and invoices to enable all participants to enhance supply chain performance.” (Clarke and Flaherty, 2003).

Supplier Portals are a technological solution that better fits SRM purposes. This tool has been designed to simultaneously develop a collaborative and long-term relationship, manage the Purchasing operation and also coordinate and control Logistics flows.

Platform technology builds, maintains and enhances collaboration and inter-firm processes and relationships, because they enable transparent information sharing along the supply chain. Supplier Portals are a technological solution that provides unified application access, information and knowledge management both within and between suppliers, trading and channel partners.

It is important to have a clear and well-defined Portal strategy to increase the portal success. In their article about B2B Portals, Clarke and Flaherty (2003) suggest a “Five D’s” model for a successful Portal development (Figure 3).

Figure 3



Source: Clarke III, T.B. Flaherty, (2003).

According to the authors these stages will reveal valuable throughout the Portal development, because will ensure that a company’s goals will be meticulously followed and ensure a successful Portal development and implementation. These stages enable the identification of the Portal purposes, the type of information and content it must have to suit those goals which will lead to an effective development, passing by a testing phase to ensure the goals are met. Finally it is important that the tool is maintained and improved throughout time according to the feedback of the main users, thus obtaining the best results.

In their study, Baglieri et al (2006), have described the main characteristics of portals which lead to their beneficial side to SRM, summarized in Table 5.

Table 5 - Portal Beneficial Features

Portal Beneficial Features
<ul style="list-style-type: none"> ▪ Improve efficiency in transactions; ▪ Improve coordination and control of logistic flows; ▪ Improve efficiency of Purchasing process; ▪ Enable information sharing; ▪ Create sense of community among suppliers; ▪ Increase stability of relationships ▪ Increase supplier’s loyalty to customers.

Source: Own elaboration based on Baglieri, Croom and Secchi, (2006).

Despite all benefits, it is important to understand if suppliers are willing to use these collaborative tools.

Suppliers who have many clients may find themselves obliged to use different platforms, which in the end means they have to spend resources and develop solutions to be able to use them all. On the hand, there are suppliers with limited technological resources, who may have difficulties to adopt such technologies and will have to dedicate staff to manage these portals. Additionally, suppliers' don't see the benefits of the portal for their internal processes, so it is the focal firm role to make sure the suppliers understand the benefits the portal may bring into their relationship (Baglieri et al, 2007).

The authors suggest that the base for a successful portal implementation is to determine the strategical goals for the portal and the focal's company top management support during the implementation phase, because this will encourage the suppliers involvement. In their article, the authors list the key areas, which need support:

- Dissemination of information;
- Training of suppliers on how to interact with the portal;
- Ensure operational support for the portal's tools;
- Ensure aid in case of technological disruption;
- Monitor supplier's satisfaction with the portal;
- Take effective corrective and preventive measures in case of dissatisfaction;

Mattos and Laurindo (2017), in their study about Information Technology adoption and assimilation, state that many times Supplier Portals do not reach their utilization. It is very common to see external pressure as the main reason for suppliers to adopt the tool and no so much the benefits the tool can bring to them. Therefore, the role of the partner that is implementing the tool, is crucial, in order to foster the use of the portal by the suppliers and reach the expected results.

The authors describe a set of measures, companies must consider when implementing this kind of technological tool:

Table 6 - Measures to IT assimilation

Measures to IT assimilation
<ul style="list-style-type: none"> ▪ System Integration capabilities; ▪ System Sustainability; ▪ System Quality of performance; ▪ Training of users; ▪ Auditing standards; ▪ Continuous platform improvements; ▪ Continuous communication with suppliers to mitigate problems with the usage of the tool; ▪ Communicate the benefits of the tool;

Source: Own elaboration based on C.A. Mattos, F.J.B. Laurindo (2017)

Considering the crucial role of the suppliers' involvement in a portal's success, companies need to be aware of the social and organizational factors of an ICT implementation, which has a direct impact on the results (Mattos and Laurindo, 2017).

2.4 Conclusion

It is clear that relationships are important within supply chains and bring about several acknowledge benefits. Cost reduction, increased productivity, lead-time fulfilment are some of the results which can be achieved by a well-managed Supply Chain. However, through this literature review it was possible to state that the key word is relationship, and so Supplier Relationship Management is the cornerstone of a company's success.

Moreover, combining Information and Communication Technologies, such as Portals, with Supplier Relationship Management enhances the already mentioned benefits of this process. Nevertheless, companies must take care and implement such technologies without neglecting the involvement of the main user - the Supplier – this will may dictate the success or failure of the Portal implementation.

This selection of literature review served as base of the work developed at COINDU SA, both to support the analysis of the expected improvements brought by the Supplier Portal and the necessary measures to ensure a successful development and implementation.

3. Problem Characterization

Following the literature review presented above, it is possible to ascertain the importance of the role relationships between buyer and supplier play in companies' strategic goals, and that companies' are willing to invest in ICTs in order to achieve those goals. Focusing on the automotive industry, and particularly in the context of a Tier 2 company, SRM is crucial

As previously stated, considering the low involvement of a Tier 2 supplier in the selection phase and contract negotiation, SRM process gains a particular importance.

The degree of success in the supplier management, in this case, lies not on well-established contractual conditions, since these are pre-defined by a third party, but on the everyday management. Therefore, Tier 2 has to focus their supplier management particularly on the Quality and performance and leave the selection to non-business material suppliers.

Companies need to work closely with their suppliers to ensure Quality and consequent performance. Therefore the criteria behind the evaluation processes, Quality, price, technology and innovation, flexibility and delivery efficiency, have be clear for the suppliers and lead to common activities, which will result in a continuous improvement and cost reductions associated with performance levels.

In a Tier 2 supplier context, given the impossibility to select at first hand the key suppliers, companies need to focus on the evaluation of suppliers. This reality brought to light the need to improve the current SRM process of a Tier 2 company. The company strategy to improve SRM process starts by the implementation of a Supplier Portal

This work is based on the implementation of a Supplier Portal at company COINDU, which allow the understanding of the company's strategies in this area and the need to develop new tools to improve the current process. The company's main objective with this new Portal is to provide a secure and structured environment, in which all communication and workflows between COINDU and suppliers are managed in an easy and intuitive manner.

There is extensive literature on SRM and on the role of ICTs in the SCM, but from this research, it was possible to identify that there is much to be studied on side of the lower Tier SCM management strategies.

This work aims to address that gap and help to shed light on how lower Tier suppliers improve their processes through the use of ICTs, particularly in SRM processes, which is a Key process for industrial companies.

3.1 Project Objectives and Research Questions

As previously stated, the purpose of this work is to study the importance of an effective supply chain management with particular focus on how the relations between supplier and buyer in a Tier 2 context work. Furthermore, this work aims to show how ICT can support companies in this process. It is also expected to analyse the current SRM process at company COINDU SA and how the implementation of the Supplier Portal expects to improve this process. Additionally, it was possible to accompany the development of the Supplier Portal and determine whether the objective set for it were met.

The study aims to answer following questions:

1. How important is Supplier Relationship Management for a Tier 2 company?
2. How do these companies manage their suppliers?
3. How will a Supplier Portal support and/or improve a Supplier Relationship Management process?

In the automotive industry, and based on the literature review, the raw materials have a high weight in the final product result. As such, this project allowed the understanding of the importance the company at hand gives SRM and the strategy followed to improve this process at the company. The development and implementation of the Supplier Portal made it possible to state that ICTs can be considered an ally for companies that aim to increase their competitive advantages.

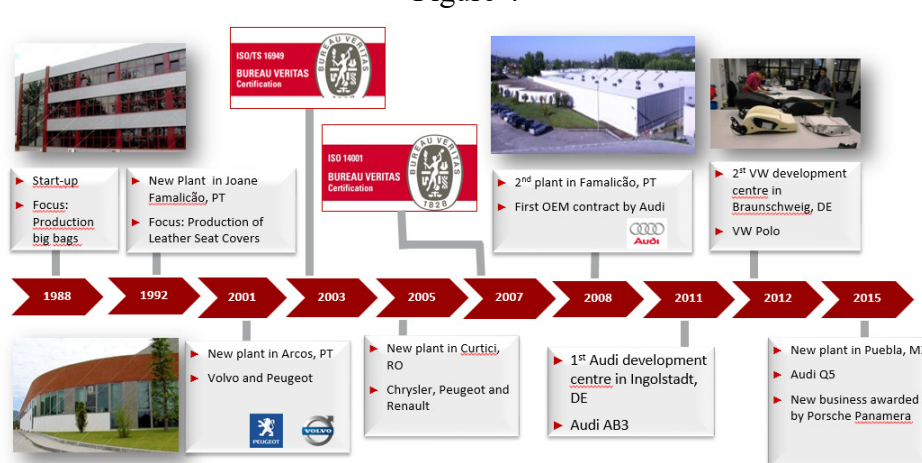
3.2 Company Presentation

Founded in 1988 with 183 employees, COINDU core business is the production of seat covers for different OEMs (Original Equipment Manufacturer). Today, COINDU has over 4.000 employees worldwide and is known amongst the major brands for the Quality of its products and the flexibility of its manufacturing process. Trying to respond positively to the expectations of their customers is the cornerstone of the COINDU Group.

The early line of business was industrial bags, only in 1992 the company entered the automotive industry and started their core business: production of leather seat covers.

Within two decades, the company grew from one small textile company, to a large international automotive industry supplier.

Figure 4



Source: Own elaboration based on the company's website <http://www.COINDU.com/pt/nossa-historia>

In time, COINDU was able to reach higher in the automotive industry and opened development centers. This allowed the company to enter early in the supply chain, thus increasing their importance and participative role in the project development. Currently, the company is part of the restricted list of OEMs nominated suppliers, doing business with brands of high segments, as illustrated in Figure 5.

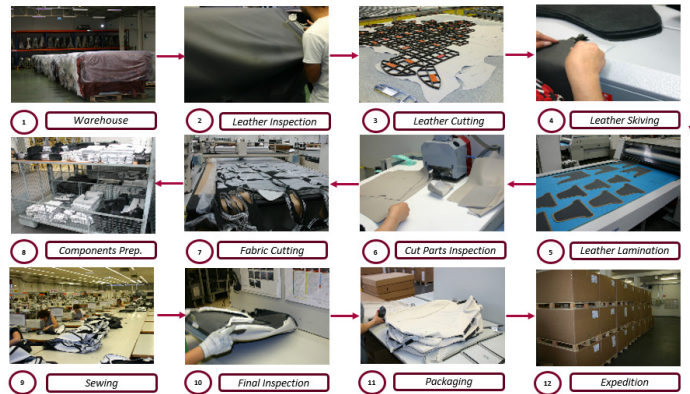
Figure 5 – COINDU's Customers



Source: <http://www.COINDU.com>

COINDU's activity can be considered Handcraft, because despite having the highest technological systems and machinery, the final product is still handmade. In twelve steps, the company produces one seat cover, as shown by Figure 6:

Figure 6 – COINDU's Process Activities



Source: Own elaboration based on the <http://www.COINDU.com>

The company demands top Quality throughout the whole process and without top Quality material COINDU would not be able to ensure Top Quality products to their customers. In fact, the company's slogan is to "Go beyond Customer's expectation's" by ensuring top Quality and top service.

This Quality-based philosophy is the key of the company's growth, and this has allowed the company to be considered a Top Supplier, winning the "Volkswagen Group Award 2016" for one of the best suppliers of the renowned OEM.

4 Methodology

Throughout the next section is presented the methodology used in this study as well as the methods used in data collection and the participants in the project.

4.1 Method used in the project

As already stated, the aim of this study is to analyse the importance of Supplier Relationship Management and how a Supplier Portal can improve this process. The project was developed at company COINDU SA in real working context, which enabled to understand the company's strategies and positioning concerning SRM and how the Supplier Portal appeared as a solution to the identified shortcomings and difficulties in the company's SRM process.

The real working conditions in which the project was developed led to a qualitative research approach. The purpose of the work is to answer the research questions already presented, through a qualitative approach, where it is expected to analyse a phenomenon in its natural context (Njie and Asimiran, 2014) – how COINDU handles and manages their relations with suppliers and their strategy to improve this process with a Supplier Portal

Further to Moreira (2002), participant observation is “a field strategy which combines at the same time active participation with the subjects, the intensive observation in natural environments, informal open interviews and documental analysis.” This concept adjusts to this study, which was performed by an active role in the project and in a real working context with direct observation of the situation in study.

As a participant in the project it was possible to access data, interact with other elements of the project and observe directly the subject in study. This direct contact with those involved in the project was of extreme importance for the development of this work and was based on this that the data collection methods were chosen.

4.2 Data Collection

Data collection is an important step, since it will be the base of the whole project. In order to obtain more detailed information, data collection was done as follows:

- Direct observation during day-to-day working conditions as a company collaborator;
- Interviews to five elements directly involved in and affected by the Supplier Portal project;
- Online inquiry to Suppliers, who will be the main users of the Supplier Portal;

It is important to point out the company's availability to cooperate in the study, facilitating the data collection and authorizing the semi-structured interviews, which turned out to be an outstanding source of information.

Interviewing is a method often chosen in qualitative research, it allows the researcher to obtain information through a “conversation between two or more people with a specific purpose in mind” (Moreira,2002). There are at least three types of interviews:

- Structured – with a set of closed questions followed in a specific order;

- Non- structured – with a set of questions, completely open and with a script which serves as a guide;
- Semi-structured – follows a script with a set of questions, and the researcher might add questions throughout the interviews depending on the answers of the interviewees.

In order to obtain the best possible outcome of the interviews, a script was elaborated and followed as a support throughout the interviews. For this study semi-structured interviews were chosen, because not only the interviewees are familiar with the topic in study, but also it allowed to obtain more detailed information as a result of the answers obtained. In accordance with Boyce e Neale (2006), the interviews were planned as follows:

Figure 7 – Interview Procedure



Source: Own elaboration based on Palena Neale, (2006)

In a Tier 2 context, the activities with highest impact on SRM are Quality Management, Purchasing Management and Logistics Management. Therefore, the elements chosen have important functions on the above mentioned activities. The interviews were recorded and transcribed with the permission of the interviewees. The average duration of the interviews was of 30 minutes.

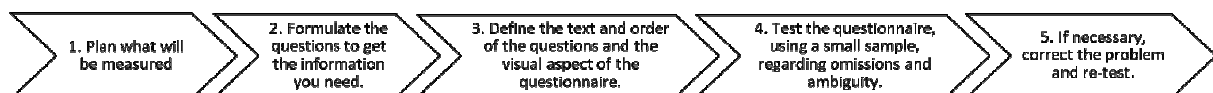
Table 7 – Participants in the interviews

Activity/Function:
Quality Manager
Corporate Logistic and Planning Manager
Corporate Purchasing Manager
Corporate Quality and E. Manager
Technical Quality

Source: own elaboration

Additionally an online inquiry was sent to the company's suppliers. As the main user of the Portal, an inquiry was created in order to obtain information from a different point of view on the same topics in study.

Figure 8 – Inquiry Procedure



Source: Own elaboration based on: Aaker, et al, (2001)

The inquiry was sent by email to the main suppliers of the business unit, with a letter informing them the purpose of the inquiry. The suppliers were grouped according to the material they supply: leather, textile, vinyl, foam and hang-on parts.

5 Project Description and Analysis of the Results

In this section, the information obtained through observation, interview and inquiry, is presented and analysed. As a result of the data it was possible to analyse how the company COINDU manages SRM and how the Supplier Portal came to be the solution for the identified problems.

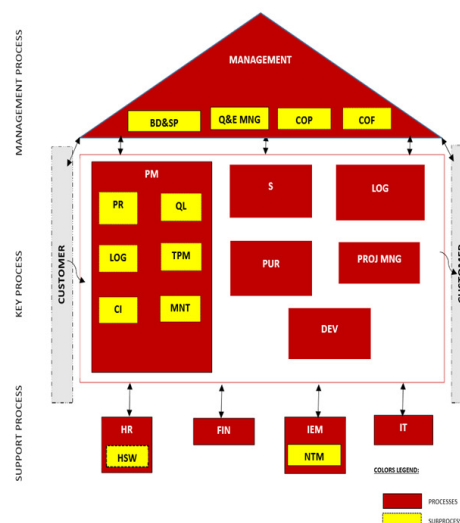
5.1 Company COINDU SA

First, it is important to characterise the current SRM at the company. Based on my working experience in the company and during the development of this study, particularly through observation and interviews it was possible to determine that SRM process at company COINDU is touched by several activities, from Logistics to Purchasing, Quality and Finance. However there are two key activities whose tasks have direct impact on the relationship with suppliers: Quality and Purchasing. Logistics also works with suppliers on a daily basis, but under the conditions previously set by the above mentioned areas, where this project is focused. Therefore, both Quality and Purchasing work daily to create and maintain relationships with suppliers, ensuring that they comply with the company's Quality requirements and also guarantee that the customers' requirements for materials and supply chain management are not put at risk.

This can only be achieved by a strong internal integration and coordination of activities and processes, in order to have effectiveness, proper information flow and exchange, thus reaching the company's objectives.

COINDU is structured in processes linked together and the output of some is the input of another process, working in a cycle mode, which makes it crucial to have a strong sense of teamwork, and working together to reach a common goal

Figure 9 – House of Processes



Source: QUALITY AND ENVIRONMENT MANAGEMENT, COINDU SA

Accuracy and transparency is the key to a successful information exchange and flow, particularly between processes, which rely on the information received to execute their work. At COINDU, this is ensured by two softwares ERP SAP and SIAP (Shopfloor system). The ERP is the core of the information exchange for the whole company, thus granting real time information access for all processes and full integration between them. SIAP is the internal software for shofloor control, which receives information from ERP SAP and sends information to ERP SAP, ensuring full integration of both softwares.

Additionally, company COINDU relies on other sources of information accessible to all company collaborators:

- COINDU Intranet – all collaborators have access to this intranet where the company releases generic information and also the company’s activities are posted.
- COINDU HR Portal – this portal is related to human resources and here the collaborators may access to their internal process, their performance evaluation, manage their attendance. Managers have here also the possibility to manage staff, recruitment needs, team performance, among other functionalities related to their management activities.
- COINDU ECM Portal – this is a SAP document management system, where all documents are managed, ensuring validity. Procedures, working instructions, manuals are some of the documents stored, managed and accessible in this portal

This illustrates how important information is for the company, not only in terms of quantity, but also in terms of accessibility, transparency and accuracy. In line with this strategy the company decided it was time to launch a Supplier Portal, adding to the company’s portfolio a new tool which would improve the relation and communication with suppliers.

5.2 Supplier Relationship Management

Supplier Relationship Management as an activity does not exist at COINDU, it is included on the activities of the key processes, particularly at Quality, Purchasing and Logistics. In the context of the automotive industry and of a Tier 2 supplier, such as COINDU’s, SRM is subject to several constraints, which come from the OEM nomination. So, the work in terms of relationship management in the day to day business gains particular importance.

Based on the company position in the supply chain, considering that most supplier are nominated to OEM, COINDU’s supplier management is mainly focused on Supplier Evaluation. However, this is not a limiting approach, because the focus of the company is on the Quality of the product, which will be directly affected by a supplier’s evaluation.

As a member of the automotive industry, COINDU is subject to very strict standards, such as ISO9001 and IATF16949. Quality is the pillar of these standards and as such, the company is very demanding in terms of Quality. 80% of the company’s suppliers are nominated by the OEM, which means the contractual relation is not done directly with them, and this is the main constraint when working under these terms. Nevertheless, the company values the relationship it has with the suppliers, because “A good relationship management will give us the best results in the end.” (Quality Manager, interview, 2 de julho 2018). The OEM based on the results obtained has awarded company COINDU in 2016.

5.2.1 Supplier Selection

The selection process at COINDU, is mostly non-business related. Nevertheless, the selection process is subject to rules and the suppliers must meet a set of requirements in order to become an official company supplier.

COINDU Selection process is a corporate process, but since it is valid mainly for non-business material, is managed by each site separately, based on the geographical situation. The COINDU supplier profile, for non business materials, has following characteristics:

- Competitive in terms of price;
- Certified by ISO9001; IATF16949; ISO14001;
- Flexible and proactive;
- Technically differentiated;
- Competitive Purchasing Conditions;

The selection and negotiation process is triggered by an internal request or need and can be explained by Figure 9. After a supplier is approved and selected a Quality Agreement and contract is signed.

Figure 10 – Selection Process



Source: Own elaboration

As far as the business materials are concerned, here the negotiation is harder. The contract is negotiated previously with OEM, leaving Tier 2, in this case, with the task to manage a supplier under terms not agreed by them.

5.2.2 Supplier Evaluation

As previously stated, SRM is focused on supplier performance. Considering the degree of the impact the materials have on the company's final product, it is imperative to evaluate their performance in order to understand what needs to be improved, and what actions are needed to ensure not only, the company's requirements, but also the customer's.

Suppliers are evaluated on a monthly basis and the main tool used in the company for evaluation purposes is the Scorecard. Currently the Scorecard is sent monthly by email to all suppliers, by the Logistics, but Quality also has a key role in the evaluation process.

All business suppliers are evaluated and also the services suppliers, such as Logistic services suppliers, such as transport companies and warehouse platform companies.

The targets are set for the suppliers depending on the type of material usually through a Quality Agreement and Delivery Terms agreements signed in the beginning of a project. Some suppliers, considering their position as nominated suppliers, refuse to sign the agreements.

The criteria for evaluation purposes are mainly Quality and Logistics related, as listed on Table 8.

Table 8 – Evaluation Criteria

Raw Material Suppliers	Logistic Services Providers
PPM	Delivery performance
Written Complaints	Missing documentation
Documentation Delivery	Material Supplied
Delivery performance	
Competitiveness	

Source: Own elaboration

Logistic teams and Quality teams insert on ERP system all inputs necessary to make the evaluation. The results are shared with the suppliers and internally by email every month. The procedure is valid for all plants of COINDU group.

As a result, from the performance evaluation, the suppliers are classified by a rating system, which grades the suppliers A, B or C, depending on their performance results. The suppliers must reply with a set of actions in order to correct the deviations.

Table 9 – Supplier Rating System

SUPPLIER	PERFORMANCE	ACTIONS
SUPPLIER A	Good	<ul style="list-style-type: none"> Monitor the supplier in order to evaluate the continuation of the Quality patterns
SUPPLIER B	Médium	<ul style="list-style-type: none"> Supplier should correct urgently the problems founded and send 8D report check subsequent deliveries to analyse if problem was solved
SUPPLIER C	Bad	<p>Supplier defined by the costumer:</p> <ul style="list-style-type: none"> It should correct with urgency the found problems and send 8D report check subsequent deliveries to analyse if problem was solved If the problem persists, notify the customer about the problem and ask support in the resolution <p>Supplier choosen by COINDU:</p> <ul style="list-style-type: none"> It should correct with urgency the problems and send 8D check subsequent deliveries to analyse if problem was solved

Source: Own Elaboration

Should a supplier neglect to reply there is an escalation procedure in order to ensure compliance.

Table 10 – Escalation Procedure

Step	Action	Responsibility
1st	Send REMINDER after deadline, to sales manager, Quality, and Logistics (2 days for reply).	RM Quality responsible
2nd	Send mail to supplier (top management, sales manager, Quality, and Logistics) with alert, schedule meeting or conference call. Inform COINDU plant manager.	Quality Technical Administrative
3rd	Involving of the client in case of nominated suppliers.	Quality Manager
4th	Escalate to the Plant manager / top management shall decide need of visit / audit. Plan supplier audit.	Quality Manager

Source: Own elaboration

In parallel there are several activities done with the suppliers in order to solve the problems identified and to correct them to avoid reoccurrence.

The management of these activities is done mainly manually and shared by email. All inputs are inserted in ERP and SIAP system and after treatment that are shared both with suppliers and internally by email.

5.3 Inquiry and Interview Result Analysis

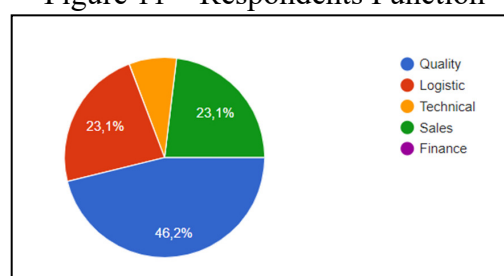
As previously stated, the data obtained from the interviews and from the inquiry to the suppliers, was used as base to understand the current SRM process and which the points for improvement are. Later it was possible to understand whether the named flaws are reflected in the Portal, which will result in the SRM improvement.

5.3.1 Supplier Inquiry

The Supplier Inquiry was done using Google Forms. Based on the study objectives a set of questions was elaborated focusing on current buyer-supplier relationship through the point of view of the supplier and on the potential benefits, a supplier portal would bring.

The inquiry was sent to 70 suppliers, in a total of 104 contacts of different functional areas: Logistics, Quality and Sales, the main areas with supplier contacts. The inquiry was sent via email on 25th of May and a reminder was done on sixth of July. 13 answers were received, which gives a response rate of 18,6%.

Figure 11 – Respondents Function



Source: Supplier Inquiry

The main objective with this inquiry was to understand, from the point of view of the supplier the current relation with COINDU as a customer and the potential benefits from a portal. The questions were sent in three main categories:

Table 11 – Inquiry Categories

General information	Relational Information	Portal Information
Material Group	Communication	Use of portals
Functional Area	Knowledge of Objectives	Functionalities
	Current difficulties	Expected benefits

Source: Own elaboration

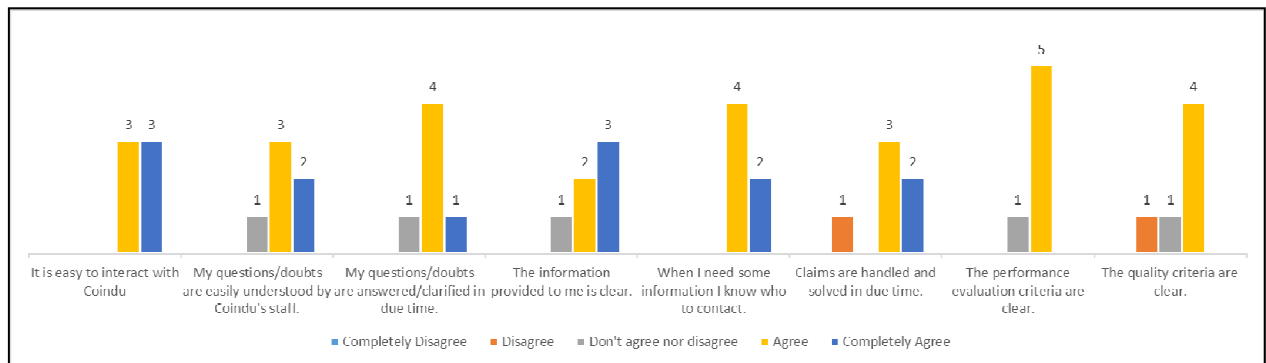
The inquiry was structured by multiple-choice questions using a Lickert scale, and also two free answer questions, these related to portal functionalities and expected benefits.

10 of the 13 respondents are suppliers of surface materials, including leather, which is a very good indicator, since they are considered the most difficult suppliers. Most of the interviewees consider leather suppliers the more resistant to use the portal.

53,8% of the respondents have a relationship with COINDU for more than 10 years and 69,2% consider COINDU a partner and 100% answered to be open to negotiate a Quality Agreement. Nevertheless, some chose not to answer this question.

100% of the respondents confirmed that email is the most used mean of communication with COINDU, but it is also clear from the answers to question no.2 of the second section of the inquiry that there is margin for improvement, because not everything is clear to the suppliers and it takes too long to solve questions.

Figure 12 – Relational Information Graphic



Source: Own elaboration

There is a positive feedback from the suppliers in terms of relationship with COINDU, but it is clear there is margin for improvement.

Regarding the Portal itself, 83,3% of the respondents don't have a similar portal at their company, which can be seen as a confirmation of the competitive advantage it will bring to COINDU. However, all are familiar with supplier portals and use it regularly, but it is important to point out that, it can be considered a weight, to have another portal to manage, one answer "To check the portal frequently is significant higher effort for the supplier." Indicates just that.

From the answers to the portal related questions, it is possible to ascertain that the supplier portal will bring benefits to the relationship between COINDU and the suppliers, and it will improve efficiency in supplier management, particularly in terms of Quality. The answers suggest that it takes longer than expected to close claims, document sharing between both companies could be improved and the both supplier rating and performance evaluation are considered very important. In the point of view of the suppliers, there are several benefits of the Portal, summarized in Table 12.

Table 12 – Portal Benefits

Benefits of the Portal	Improvements to Relationship with COINDU
Improve information flow Improve communication Improve buyer-supplier relationship Documents upload and download Publication of Claims Comex management Answer to claims and 8D reports Publication of performance evaluation Supplier Rating Company General communication and event information	Communication efficiency Claim management efficiency Improved Performance Transparency

Source: own elaboration

To conclude, from the supplier's point of view a Supplier Portal will improve their relation with COINDU and increase the efficiency for both companies in terms of communication, information sharing and costs.

5.3.2 Interviews

The participants of the interviews were selected considering their functional areas and their daily work, which is mainly focused on suppliers. Their activities will be the main beneficiaries of the Portal. As presented on Table 7, the functional areas are Logistics, Quality and Purchasing.

Based on the literature review on the interview script had three main areas: SRM, ICT's impact on SRM, and Supplier Portals. From the interviews, it was possible to ascertain the importance SRM has for the company on all areas, particularly for Quality. For all areas interviewed, it is clearly high the impact on the Quality management, which in the end will extend the benefits for the other areas.

Considering that 85% of the suppliers are nominated by the OEMs, who negotiate not only prices but also conditions, the company position with the suppliers is limited. This makes it more importantly to invest in the relationships with the suppliers. For the company, SRM is done by controlling and evaluating the suppliers and working together with them in order to correct and prevent deviations.

Even though the company is not able, under current conditions, to improve contractual terms, it can most definitely improve the relationships, which in the end will result in a better performance.

In this industry, Quality and non-Quality management is critical to ensure top Quality towards final customers. The costs related to non-Quality are too high to be neglected. Hence, it is of utmost importance to improve. The data behind the supplier evaluation, performance and Quality are not centralized and the calculations behind the rating system, though accurate, are subject to human error. Additionally, document management, is not properly standardized, in terms of accessibility and sharing potential

The company strategy is to use the Portal as a corporate tool, thus standardizing all procedures in regards to supplier management.

All of the interviewed state that the biggest difficult, currently, lies in the amount of manual tasks and lack of integration. This makes it difficult to control and manage the suppliers in an efficient way. There is no sense of trust with the suppliers, who receive the performance evaluation results by email, the Quality claims are managed by email, and all consider that such an important topic as Quality and non-Quality management has to be managed in a more efficient, standardized and accurate way.

For the Purchasing process, considering the limitation it is to achieve economic objectives with nominated suppliers, the right way is to invest on the relation. The Portal on itself will not be the solution for all problems, but it will certainly be the gateway for relationship improvement. The Portal will make it available all information also to the supplier. The data behind the performance, rating, claims, will be available. There is more organization, rigor of information and sharing availability. Both the suppliers and the company will be able to share documents, technical data or other sort of general information, thus increasing the sharing availability. This will allow the company to make analysis, which will serve as input to strengthen arguments in negotiation contexts both with the suppliers and with the OEM. On the other hand, the transparency behind the portal will create a sense of trust, will eliminate ambiguity, which favors the relationship (Interview, 04.07.2018).

In terms of non-nominated suppliers, the Portal will be the gateway for suppliers to approach COINDU and the company will be able to have a structured supplier portfolio. This will make market search more efficient, which might result in economic savings.

Working the relationship with nominated suppliers and the economic goals with the others will allow the company to achieve better results.

The Logistic process suffers from the fact that there is no margin for negotiation with the critical suppliers. The company has to work according to the terms and conditions agreed with the OEM. The goal is to focus on the performance and work from there. Logistic works hand in hand with Quality in order to get the most of the suppliers, in terms of Quality. The lower the Quality problems, the better performance, will result in a better logistic efficiency and product Quality.

The Supplier Portal will allow both COINDU and the Suppliers to access information, the publication of performance results, and the suppliers' feedback to it, all in an integrated system (Interview, 04.07.2018).

All the participants consider it difficult the engagement of the suppliers with this new tool. The power of nominated suppliers, those of highest importance for the company, is very high, and since some of them are also competitors, it is crucial to have a strategy to make them use the new tool. Therefore, the strategy of the company is to send a message that the portal is not obligation – not even the Quality standards to which all in the supply chain must follow, say it

is a requirement to have and/or use a portal. So, the message has to be focused on the advantages it brings to all. A Supplier Portal is a technological tool with evident benefits for all.

Nowadays, the industry is looking for ways to reduce costs, one way is to cut on resources, so the suppliers will not be open to use a software, if it implies more resources. It must be clear to all users that the Portal is not a “stalker” because it will be the base of all information, of the evaluation results, but in fact a “facilitator”, because all that is needed for the proper supply chain to work will be available in easy, transparent and organized way.

5.4 Supplier Portal

The company strategy with the Portal is to improve the Supplier Relationship Management. The portal’s main objectives are to provide a secure and structured way for new businesses to become an approved COINDU supplier and also to provide a centralized environment in which all the communication and workflows between COINDU and the suppliers are managed in a easy and intuitive way.

This technological tool will be built on an open source CMS framework, Drupal 8 or similar. This platform will bring the following benefits:

- Scalability: it will easily scale as your business grows
- Community: hundreds of thousands of developers support and enhance the platform
- Interoperability: using de facto standards, all components are easy to extend

The portal will be developed using PHP 7.2 and MySQL 5.7.

The COINDU Supplier Portal will be restricted to the public access because it contains sensitive information about the supplier’s workflow, internal procedures and contact information. In order to gain access to the Web Portal and become an approved supplier, all visitors who access the portal will need to login using approved credentials (email and password). In the case of new suppliers, which do not have credentials, they can register for a new account and start the approval process for becoming a COINDU partner.

The project is organized in different stages:

Stage 1 – Define strategic and business objectives.

Stage 2 – Design the Portal – during this phase, the project team had several meetings with the teams of different functional areas, in order to gather the specific requirements. Each area provided information, which was used as base for the development team to work on the Portal, these are summarized on Table 13.

Stage 3 – Development – my participation in the project started in this stage. Based on the preliminary specific requirements the development team started to develop the application. The purpose of my work during the development stage, was to participate in several meetings with the teams and verify the requirements fulfillment and potentially identify new ones as the work flows. Project is currently in this stage.

Stage 4 – Testing – After the development it is planned a series of tests in the application. These will be done first by the project team, which I am part of, and later with the users, internal and external. After all testing scenarios are validated, the Portal will be implemented.

Stage 5 – Implementation

Table 13 – Preliminary Specific Requirements

Access to documentation restricted to supplier identification number.	Documents to consider: <ul style="list-style-type: none"> - Scorecard Manual; - Specific Requirements; - General Purchasing Conditions; - Suppliers manual; - Excell and word documents elaborated outside of the Portal; - Historic document management;
Supplier Performance Management	<ul style="list-style-type: none"> ' KPIs extracted from ERP SAP; - Automatic system update for document; - Previous files always replaced by most recent ones; - PDF format;
Communication	<ul style="list-style-type: none"> ' Automatic notifications; - supplier is able to reply in the Portal;
Document Management	<ul style="list-style-type: none"> ' Each supplier will be able to download and upload documents. For each document the system presents: <ul style="list-style-type: none"> - PPAP - Last status of document; - Missing documents will automatically be displayed; - Possibility to update documents; subject to COINDU validation; - Status managed by COINDU only; - PPAP expire date inserted by supplier, validated by COINDU; - COINDU can accept or reject document and informs motive; email notification; Delivery Certificates/ Control Report - supplier must upload in the system. Process similar to PPAP. <ul style="list-style-type: none"> Certification documents;
Supplier Quality Claim Management	<ul style="list-style-type: none"> - Open claims list; - Claim follow up and tasks management; - Upload of evidences of Quality Notes (QN) and Action plans. - Logistic and financial claims;

Source: Own elaboration

The structure of the Portal is in line with the objectives. First priority is related to Quality Management, based on the already named advantages it will bring to the current process in the company. A more efficient Quality management process will result in better performance and ultimately cost reduction in terms of non-Quality costs. The teams will no longer be focused on manually manage claims, documents, performance, etc, and will direct their attention to improvement strategies, to working together with the suppliers in order to obtain the best results, which will in the end be a win-win situation, because a preventive management will reduce the risk of non-Quality and hence the costs associated. Linked with the Quality Management will be other processes, namely Logistics, whose inputs concerning delivery performance will also be used as input for performance measurement, which is the top priority of the Portal

Despite having integration with ERP and SIAP systems, the Portal will not be in its full potential in the early stage, since it is necessary to make further developments not planned for this stage. In the future, there might be improvements to be considered in this area.

6 Conclusion and Future Research

Despite some contingencies related with the context in which this study was developed, it was possible to obtain important information and establish the next steps of the Portal, to be carried out after this dissertation is finalised.

The starting point of this study was to acknowledge that services engineering can be used within industrial environments to develop and improve industrial processes in order to achieve better efficiency results.

Given the opportunity to participate in the Supplier Portal development at company COINDU, I was able to extend my knowledge of the company processes and contribute with my academic knowledge as a Services Engineering student to improve the company's processes and thus contribute to its future success.

First, I have undertaken an intensive research on relevant literature review, which revealed valuable to the development of my work. In a second stage of my study, as a member of the project team, I was able to participate actively in the development phase of the Portal, still ongoing. With the inputs gathered from the inquiries and interviews, I had the possibility to verify that the Portal was covering the main requirements, which will answer to the users' needs in the daily work.

Based on the literature review and on the relevant information obtained during this study, it is possible to state that beneficial relationships between companies and their suppliers bring about numerous advantages to both. The main reason behind successful relationships lies in cooperative, integrative strategies and common goals. This success will result in a Quality product, which in turn will allow companies to maintain and grow their market position and ultimately gain competitive advantage.

The automotive industry is growing more competitive and those with lower positions in the supply chain must adopt strategies that will enable them to succeed. In the case at hand, relationship management is crucial and the company investments to obtain value from them is strong. The ultimate goal for a company is cost reduction, when this is not possible by direct negotiation, then companies must work on the relational side, by promoting transparency, integration and cooperation, to foster trust and thus reducing risks and costs associated.

In conclusion, and looking at the research questions set for this work, it was possible to reach some conclusions.

1. How important is Supplier Relationship Management for a Tier 2 company?

It is particular important, considering the context in which the company operates, which causes several constraints that must be overlapped in order to reach the objectives set by management. The lack of negotiating power has to be replaced by strong and stable relational connections. It is clear for the company that the Portal will not solve all problems, but it will promote efficiency and control. The possibility to have structured and centralised data, provided mostly by the suppliers themselves, will enable management to eliminate ambiguity, which favours good relationships. Additionally, it will increase argumentative power with both OEMs and suppliers.

For the company, the strategy is to work the way up the supply chain and act as early as possible in the project development in order to increase their influence in the supply chain.

2. How do these companies manage their suppliers?

Companies tend to develop strategies to select, develop and evaluate their suppliers in order to obtain the best results, grow and establish stronger relations.

Although not neglected, Supplier selection is not the focus of COINDU, considering the position it has in the supply chain. The primary focus is supplier evaluation and consequent development. Supplier evaluation is critical because it allows the company to mitigate problems and promote cooperation with the suppliers, in order to correct and prevent problems, and also develop improvement measures, which will have positive impact in the future.

Suppliers evaluation is mainly done to Quality and logistic criteria. Even though the process is controlled, Quality and logistic teams, who insert data in the company's systems, do it manually. Such a process has many risks, and despite the rigor put in this work, it has risks. Email is the used communication form, for all purposes, which can give a sense of lack of organisation and transparency that can negatively affect the relationship with the suppliers. In order to solve this, the company decided to implement a Supplier Portal, a type of Information and communication technology considered by many scholars as the appropriate tool to assist SRM. Its integrative and collaborative nature allow companies to enhance supply chain performance, as well as develop buyer-supplier relationships (Clarke and Flaherty, 2003).

3. How will a Supplier Portal support and/or improve a Supplier Relationship Management process?

This study revealed that the characteristics of a supplier portal are in line with the company's objectives to improve the SRM process, currently scattered along the company. Considering also the company's corporate goals, it is important to create standard processes, which will increase control, organisation and transparency.

In the particular context of company COINDU, SRM process will be improved by the implementation of the Portal because it will have a strong impact on Purchasing management, creating a structured supplier portfolio. For not nominated suppliers, this portfolio will allow the company to work for economic savings, by improving market research process, still in an embryonic state for the group.

The main beneficiary of the Portal will be the Quality process, and consequently Logistics. In this case, Logistics will gain from a better performance management, led by the Quality team. As already stated, logistic terms and conditions are previously negotiated between OEM and suppliers, so here the company has little influence. Therefore, the focus has to be on performance, the suppliers must ensure to comply to the logistic objectives, which will then result in a good performance towards the end customer.

Turning back to Quality, despite having mainly nominated suppliers, the focus on the material control and Quality will result in reduction of non-Quality costs. Additionally, the efficiency gains expected in terms of internal resources, organisation, integration and transparency, will result in a more cooperative approach with the suppliers. The higher the cooperation, the more can the company participate in the suppliers decision making, in terms of Quality, which will allow both to gain in avoiding problems.

After the Supplier Portal project is fully implemented, it would be of interest to investigate whether the expected results came true. Such an additional research would be of academic interest, since there is a gap in literature concerning the role of Tier 2 suppliers in SCM, and how these companies overcome difficulties in order to obtain competitive advantage. On one hand, there are studies in this area, which relate to OEMs roles and responsibilities and how they apply ICT to improve their processes. On the other hand, there has been little research on Tier 2 suppliers point of view on SCM, SRM and their strategies towards improvement based on ICTs.

In conclusion, it is important to point out, that the impact of ICTs in industry still needs to be studied. Nowadays, with the evolution of technologies, industry must keep up with innovation in order to maintain and grow their competitive advantage. There is still room for technology and service design to assist industry to improve their operational processes.

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APPENDIX A: Interview Plan and Script

Steps	Description
Interview framing	The interviews conducted aim to answer the following study problem: "What are the expected benefits and / or disadvantages of a Supplier Management Portal for supplier relationship management for a Tier 2 automotive supplier?" The importance of the interview comes from the interviewees being direct intervenients in the supply chain management of the company under study: Purchasing Manager; Quality Manager; Logistic Manager; and their teams.
Defining the objectives of the interview	To answer the research questions asked: 1. How important is Supplier Relationship Management, particularly in the Tier / Supplier context? 2. What are the company's objectives with the implementation of the Suppliers Portal? 3. To what extent does the Portal under study support and / or improve the relationship management with the company's suppliers?
Interviewed:	Purchasing Manager Logistics Manager Quality Manager Quality Technician
Interviewer:	Master Student, 2nd year MESG
Dead Line:	31-07-2018
Specific conditions:	Meeting Room booking
Means of Communication:	Type – oral (recorded if consented). Space – reserved space (meeting room) in the plant building. Moment – to determine with the participants
Duration	Between 20 to 30 minutes
General criteria to consider:	Although only a content analysis is done to the transcribed words of the interviewee, it should be taken into account: - The state of mind of the interviewee (trust, confusion, embarrassment ...). - Contradictions of the interviewee. - Moments in which the interviewee expresses their emotions. - Body language. - Tonality and rhythm of the interviewer's language - Gender of language used. - Environment where the interview is conducted.
Formalities:	Presentation: Create a relaxed environment, showing kindness and attention to the interviewee. Maintain professionalism, seeking to lead the interviewee to answer the questions and clarifying doubts that the latter may have. Project description: Refer the scope of the interview. Consent: Request the interviewee's authorization for the recording. From the interview: Help the interviewee express himself clearly Focus the interviewee on the main topics. - Stimulate the interviewee to expose more about the most important topics. Finish the interview: Meet the time limit of the interview. Draw up the main ideas. Present a final thank-you. Take notes: Eventually, only in case of not authorizing the recording of the interview, proceed with the direct transcription of the interview.

APPENDIX B: Supplier's Inquiry Letter

Dear Supplier,

In the context of an academic work in cooperation with company COINDU, we are developing a Supplier Portal. We would like to know your perspective about this topic in order to create a service, which will bring benefits to our work together in the future. On the other hand, we also aim to evaluate which functionalities and features you consider important for such a tool as well as your suggestions for other functionalities, which could be of value.

The development of this inquiry and the analysis to the result will be used at COINDU in the development of the Supplier Portal and in the continuous building and improvement of the relationship between our company and the suppliers.

Additionally, it will be used in a Master dissertation in Services Engineering Management (MESG) of the Faculty of Engineering of the Oporto University (FEUP).

The answer to this inquiry will take you less than 5 minutes. Your participation is volunteer and, naturally, there are no right or wrong answers to the questions. In case you choose to participate, you are asked to fill in the answers and you can stop at any time.

All information you provide in this inquiry is strictly confidential and anonymous. Both at COINDU and in the academic work, there will be no mention to any means of identification.

All data obtained from this inquiry will only be used at COINDU and for the referred Master dissertation. The information will be kept at COINDU's information systems with restricted access to COINDU's employees.

Academically, the information will be kept in information systems with restricted access to investigators, and later on in disc, being eliminated one year after the project ends, which is expected to be in September 2019.

The master student Marisa Salgado (MESG) developed this inquiry, which was supervised by Prof. João Claro (FEUP, associate professor of DEGI/FEUP and academic advisor of the master's dissertation).

Any matter related to this study, as well as claims or suggestions, can be handled through Marisa Salgado's contact:

Email: marisa.salgado@COINDU.com

Mobile: 00351 916182410

If you are available to participate in this inquiry, we ask you to access below link.

<https://goo.gl/forms/mzgmbmaFt7Vt1grf1>

Thanks for participating! Your opinion is extremely important and will provide relevant information.

APPENDIX C: Supplier Inquiry about COINDU's Supplier Portal (separate file)